



#265463 LO-CD2a Antibody and Uses - Sequence List(P:\OP\PATAP650)

SEQUENCE LISTING

(1) GENERAL INFORMATION:

- (i) APPLICANT: Bazin, Hervé
Latinne, Dominique
- (ii) TITLE OF INVENTION: LO-CD2a Antibody and Uses
Thereof for Inhibiting T-
Cell Activation and
Proliferation
- (iii) NUMBER OF SEQUENCES: 96
- (iv) CORRESPONDENCE ADDRESS:
 - (A) ADDRESSEE: Carella, Byrne, Bain,
Gilfillan, Cecchi, Stewart & Olstein
 - (B) STREET: 6 Becker Farm Road
 - (C) CITY: Roseland
 - (D) STATE: New Jersey
 - (E) COUNTRY: U.S.A.
 - (F) ZIP: 07068
- (v) COMPUTER READABLE FORM:
 - (A) MEDIUM TYPE: 3.5 inch diskette
 - (B) COMPUTER: IBM PS/2
 - (C) OPERATING SYSTEM: MS-DOS
 - (D) SOFTWARE: WordPerfect 5.1
- (vi) CURRENT APPLICATION DATA:

- (A) APPLICATION NUMBER: 08/472,281
- (B) FILING DATE: 07-JUN-1995
- (C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:

- (A) APPLICATION NUMBER: 08/407,009
- (B) FILING DATE: 29-MAR-1995
- (A) APPLICATION NUMBER: 08/119,032
- (B) FILING DATE: 09-SEP-1993
- (A) APPLICATION NUMBER: 08/027,008
- (B) FILING DATE: 05-MAR-1993

(viii) ATTORNEY/AGENT INFORMATION:

- (A) NAME: Olstein, Elliot M.
- (B) REGISTRATION NUMBER: 24,025
- (C) REFERENCE/DOCKET NUMBER: 61750-142

(ix) TELECOMMUNICATION INFORMATION:

- (A) TELEPHONE: 201-994-1700
- (B) TELEFAX: 201-994-1744

(2) INFORMATION FOR SEQ ID NO: 1:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single

(D) TOPOLOGY: linear
(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

AACCCGGGGA CATTGAGCTG ACCCAGTCTC AA

32

(2) INFORMATION FOR SEQ ID NO: 2:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 29 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

CAGTCGACTA CAGTTGGTGC AGCATCAGC

29

(2) INFORMATION FOR SEQ ID NO: 3:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 31 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear
(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

AACCCGGGGA GGTCCAGCTG CAGCAGTCTG G

31

(2) INFORMATION FOR SEQ ID NO: 4:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 27 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

AAGTCGACCC AGTGGATAGA CCGATGG

27

(2) INFORMATION FOR SEQ ID NO: 5:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 22 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

CCGCAAGCTT CATGGGATGG AG

22

- (2) INFORMATION FOR SEQ ID NO: 6:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 27 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

GCTGCTTGGG GACTGGGTCA GCTGGAT

27

- (2) INFORMATION FOR SEQ ID NO: 7:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

ATTCAGCTGA CCCAGTCTCC A

21

- (2) INFORMATION FOR SEQ ID NO: 8:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 58 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

GATCGGATCC ACCTGAGGAA GCAAAGTTTA AATTCTACTC ACGTTTCAGT TCCAGCTT

58

- (2) INFORMATION FOR SEQ ID NO: 9:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 31 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

TCTCCTGCAG TGGGACCTCG GAGTGGACAC C

31

(2) INFORMATION FOR SEQ ID NO: 10:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 21 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

GAGGTCCAGC TGCAGCAGTC T

21

(2) INFORMATION FOR SEQ ID NO: 11:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single

(D) TOPOLOGY: linear
(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

CGATGTATCA GCTGTCAGTG TGGC

24

(2) INFORMATION FOR SEQ ID NO: 12:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 24 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

GCCACACTGA CAGCTGATAC ATCG

24

(2) INFORMATION FOR SEQ ID NO: 13:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

CAGAGTGCCT TGGCCCCAGT A

21

- (2) INFORMATION FOR SEQ ID NO: 14:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 27 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

TACTGGGGCC AAGGCACCCT CGTCACA

27

- (2) INFORMATION FOR SEQ ID NO: 15:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 25 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single

(D) TOPOLOGY: linear
(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

GATCGGATCC CTATAAATCT CTGGC

25

(2) INFORMATION FOR SEQ ID NO: 16:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 43 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

TTGGATCCGC GGCCGCGTCG ACTACAGTTG GTGCAGCATC AGC

43

(2) INFORMATION FOR SEQ ID NO: 17:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 41 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

ATGGATCCGC GGCCGCGTCG ACCCAGTGA TAGACCGATG G

41

(2) INFORMATION FOR SEQ ID NO: 18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

CCATGGCCTC GAGGGCCCCC CCCCCCCCC C

31

(2) INFORMATION FOR SEQ ID NO: 19:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 29 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single

(D) TOPOLOGY: linear
(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

CCTGTTTAGG CCTCTGCTTC ACCCAGTAC

29

(2) INFORMATION FOR SEQ ID NO: 20:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 29 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

GGATAATGGG TAAATTGCAT GCAGTAATA

29

(2) INFORMATION FOR SEQ ID NO: 21:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 30 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:

TGCAAGCTTC ATGATGAGTC CTGTCCAGTC

30

(2) INFORMATION FOR SEQ ID NO: 22:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 28 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

AGTAAGCTTC ATGAAATGCA GGTGGATC

28

(2) INFORMATION FOR SEQ ID NO: 23:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23:

GGGAGATTGC TGCAGCTGGA CTTC

24

(2) INFORMATION FOR SEQ ID NO: 24:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 33 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

- (A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24:

GATCCCCGGG CCACCATGAT GAGTCCTGTC CAG

33

(2) INFORMATION FOR SEQ ID NO: 25:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 61 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25:

AGAATGGCCA CGTCATCCGA CCCCTCAGA GTTTACTATT CTACTATCCA ACTGAGGAAG 60

C 61

(2) INFORMATION FOR SEQ ID NO: 26:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 34 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26:

GATCGAATTC GCCACCATGA AATGCAGGTG GATC 34

(2) INFORMATION FOR SEQ ID NO: 27:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 37 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 27:

CCAGAAAGCT AGCTTGCCAT CCCTATAAAT CTCTGGC

37

(2) INFORMATION FOR SEQ ID NO: 28:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28:

Asp Val Val Leu Thr Gln Thr Pro Pro Thr

5

10

Leu Leu Ala Thr Ile Gly Gln Ser Val Ser

15

20

Ile Ser Cys

(2) INFORMATION FOR SEQ ID NO: 29:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 29:

Asp Val Val Met Thr Gln Ser Pro Leu Ser

5 10

Leu Pro Val Thr Leu Gly Gln Pro Ala Ser

15 20

Ile Ser Cys

(2) INFORMATION FOR SEQ ID NO: 30:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 15 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 30:

Trp Leu Leu Gln Arg Thr Gly Gln Ser Pro

5 10

Gln Pro Leu Ile Tyr

15

(2) INFORMATION FOR SEQ ID NO: 31:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 15 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 31:

Trp Phe Gln Gln Arg Pro Gly Gln Ser Pro

5 10

Arg Arg Leu Ile Tyr

15

(2) INFORMATION FOR SEQ ID NO: 32:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 32 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 32:

Gly Val Pro Asn Arg Phe Ser Gly Ser Gly

5 10

Ser Gly Thr Asp Phe Thr Leu Lys Ile Ser

15 20

Gly Val Glu Ala Glu Asp Leu Gly Val Tyr

25 30

Tyr Cys

(2) INFORMATION FOR SEQ ID NO: 33:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 32 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 33:

Gly Val Pro Asp Arg Phe Ser Gly Ser Gly

5 10

Ser Gly Thr Asp Phe Thr Leu Lys Ile Ser

15 20

Arg Val Glu Ala Glu Asp Val Gly Val Tyr

25 30

Tyr Cys

(2) INFORMATION FOR SEQ ID NO: 34:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 10 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 34:

Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys

5 10

(2) INFORMATION FOR SEQ ID NO: 35:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 10 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 35:

Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys

5

10

(2) INFORMATION FOR SEQ ID NO: 36:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 81 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 36:

GCAAGAGATG GAAGCTGGTT GTCCCAAGGT TACCAATAAT GAAGGTGGAC TCTGGGTCAT

60

CACAACATCA CCATTGGTTC C

81

(2) INFORMATION FOR SEQ ID NO: 37:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 72 bases

- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 37:

CAACCAGCTT CCATCTCTTG CAGGTCAAGT CAGAGTCTCT TACATAGTAG TGGAAACACC	60
TATTTAAATT GG	72

- (2) INFORMATION FOR SEQ ID NO: 38:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 81 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: oligonucleotide
 - (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 38:

AGATTCCAGT TTGGATACCA AATAAATTAG CGGCTGTGGA GATTGGCCTG GCCTTAGCAA	60
CCAATTTAAA TAGGTGTTTC C	81

- (2) INFORMATION FOR SEQ ID NO: 39:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 81 bases

(B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear
 (ii) MOLECULE TYPE: oligonucleotide
 (ix) FEATURE:
 (A) NAME/KEY: PCR primer
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 39:
 TTGGTATCCA AACTGGAATC TGGGGTCCCC GACAGGTTCA GTGGCTCAGG GAGTGAACA 60
 GATTCACAC TCAAAATCAG T 81

(2) INFORMATION FOR SEQ ID NO: 40:
 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 72 bases
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: single
 (D) TOPOLOGY: linear
 (ii) MOLECULE TYPE: oligonucleotide
 (ix) FEATURE:
 (A) NAME/KEY: PCR primer
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 40:
 ATGGGTAAAT TGCATGCAGT AATAAACCCC CACATCCTCA GCTTCCACTC CACTGATTTT 60
 GAGTGTGAAA TC 72

(2) INFORMATION FOR SEQ ID NO: 41:
 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 63 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 41:

TACTGCATGC AATTTACCCA TTATCCGTAC ACGTTTGGAC AAGGGACCAA GCTGGAAATC 60

AAA 63

(2) INFORMATION FOR SEQ ID NO: 42:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 67 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 42:

GATCGGATCC AACTGAGGAA GCAAAGTTTA AATTCTACTC ACGTTTGATT TCCAGCTTGG 60

TCCCTTG 67

(2) INFORMATION FOR SEQ ID NO: 43:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 23 bases

- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 43:

GATCAAGCTT CATGATGAGT CCT

23

- (2) INFORMATION FOR SEQ ID NO: 44:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: oligonucleotide
 - (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 44:

GCAAGAGATG GAAGCTGGTT G

21

- (2) INFORMATION FOR SEQ ID NO: 45:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 45:

CAACCAGCTT CCATCTCTTG C

21

- (2) INFORMATION FOR SEQ ID NO: 46:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: oligonucleotide
 - (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 46:

AGATTCCAGT TTGGATACCA A

21

- (2) INFORMATION FOR SEQ ID NO: 47:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 24 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 47:

TTGGTATCCA AACTGGAATC TGGG

24

(2) INFORMATION FOR SEQ ID NO: 48:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 24 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 48:

ATGGGTAAAT TGCATGCAGT AATA

24

(2) INFORMATION FOR SEQ ID NO: 49:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 24 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 49:

TACTGCATGC AATTACCCA TTAT

24

(2) INFORMATION FOR SEQ ID NO: 50:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 26 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 50:

GATCGGATCC AACTGAGGAA GCAAAG

26

(2) INFORMATION FOR SEQ ID NO: 51:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 30 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 51:

Glu Val Gln Leu Gln Gln Ser Gly Pro Glu

5

10

Leu Gln Arg Pro Gly Ala Ser Val Lys Leu

	15	20
Ser Cys Lys Ala Ser Gly Tyr Ile Phe Thr		
	25	30

- (2) INFORMATION FOR SEQ ID NO: 52:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 30 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS:
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: polypeptide
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 52:

Gln Val Gln Leu Val Gln Ser Gly Ala Glu	
	5 10
Val Lys Lys Pro Gly Ala Ser Val Lys Val	
	15 20
Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr	
	25 30

- (2) INFORMATION FOR SEQ ID NO: 53:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 14 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS:
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 53:

Trp Val Lys Gln Arg Pro Lys Gln Gly Leu

5

10

Glu Leu Val Gly

(2) INFORMATION FOR SEQ ID NO: 54:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 14 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 54:

Trp Val Arg Gln Ala Pro Gly Gln Gly Leu

5

10

Glu Trp Met Gly

(2) INFORMATION FOR SEQ ID NO: 55:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 32 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 55:

Lys Ala Thr Leu Thr Ala Asp Thr Ser Ser

	5	10
Asn Thr Ala Tyr Met Gln Leu Ser Ser Leu		
	15	20
Thr Ser Glu Asp Thr Ala Thr Tyr Phe Cys		
	25	30
Ala Arg		

(2) INFORMATION FOR SEQ ID NO: 56:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 32 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 56:

Arg Val Thr Met Thr Arg Asp Thr Ser Ile		
	5	10
Ser Thr Ala Tyr Met Glu Leu Ser Arg Leu		
	15	20
Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys		
	25	30
Ala Arg		

(2) INFORMATION FOR SEQ ID NO: 57:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 11 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 57:

Trp Gly Gln Gly Thr Leu Val Thr Val Ser

5

10

Ser

(2) INFORMATION FOR SEQ ID NO: 58:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 11 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 58:

Trp Gly Gln Gly Thr Leu Val Thr Val Ser

5

10

Ser

(2) INFORMATION FOR SEQ ID NO: 59:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 88 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 59:

GATCAAGCTT CATGAAATGC AGGTGGATCA TCCTCTTCTT GATGGCAGTA GCTACAGGTA 60

AGGCACTCCC AAGTCGTAAA CTTGAGAG 88

(2) INFORMATION FOR SEQ ID NO: 60:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 87 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 60:

CACCTGTGAG TTGACCCCTG TTGAAAGAAA TCCAAAGATA GTGTCACTGT CTCCAAGTG 60

TATGATCTCT CAAGTTTAGG ACTTGGG 87

(2) INFORMATION FOR SEQ ID NO: 61:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 78 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 61:

ACAGGGGTCA ACTCACAGGT GCAGCTGGTG CAGTCTGGGG CTGAGGTGAA GAAGCCTGGG 60

GCCTCAGTGA AGGTCTCC 78

(2) INFORMATION FOR SEQ ID NO: 62:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 78 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 62:

GGCCTGTGCG ACCCAGTACA TATAGTACTC GGTGAAGGTG TATCCAGAAG CCTTGCAGGA 60

GACCTTCACT GAGGCCCC 78

(2) INFORMATION FOR SEQ ID NO: 63:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 78 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 63:

ATGTACTGGG TGCACAGGC CCCTGGACAA GGGCTTGAGC TGATGGGAAG GATCGATCCT 60

GAAGACGGTA GTATTGAT 78

(2) INFORMATION FOR SEQ ID NO: 64:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 78 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 64:

TGTGCTAGAG GACGTGTCAG CGGTCAGGGT GACCTTTTTC TTAAACTTCT CAACATAATC 60

AATACTACCG TCTTCAGG 78

(2) INFORMATION FOR SEQ ID NO: 65:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 84 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 65:

GCTGACACGT CCTCTAGCAC AGCCTACATG GAGCTGAGCA GCCTGACCTC TGACGACACG 60

GCCGTGTATT ACTGTGCGAG AGGA 84

(2) INFORMATION FOR SEQ ID NO: 66:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 87 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 66:

GGACTCACCT GAGGAGACGG TGACCAGGGT TCCTTGCCCC CAGTAAGCAA ACCTATAGTT 60

AAACTTTCCT CTCGCACAGT AATACAC 87

(2) INFORMATION FOR SEQ ID NO: 67:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 69 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 67:

ACCGTCTCCT CAGGTGAGTC CTTACAACCT CTCTCTTCTA TTCAGCTTAA ATAGATTTTA	60
CTGCATTTG	69

(2) INFORMATION FOR SEQ ID NO: 68:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 69 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 68:

CCTAGTCCTT CATGACCTGA AATTCAGATA CACACATTTT CCCCCAACA AATGCAGTAA	60
AATCTATTT	69

(2) INFORMATION FOR SEQ ID NO: 69:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 72 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:

- (A) NAME/KEY: PCR primer

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 69:

TTCAGGTCAT GAAGGACTAG GGACACCTTG GGAGTCAGAA AGGGTCATTG GGAGCCCGGG	60
CTGATGCAGA CA	72

- (2) INFORMATION FOR SEQ ID NO: 70:

- (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 72 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

- (ii) MOLECULE TYPE: oligonucleotide

- (ix) FEATURE:

- (A) NAME/KEY: PCR primer

- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 70:

GATCGGATCC CTATAAATCT CTGGCCATGA AGTCTGGGAG CTGAGGATGT CTGTCTGCAT	60
CAGCCCGGGC TC	72

- (2) INFORMATION FOR SEQ ID NO: 71:

- (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 25 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single

- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 71:

GATCAAGCTT CATGAAATGC AGGTG

25

- (2) INFORMATION FOR SEQ ID NO: 72:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 23 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: oligonucleotide
 - (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 72:

CACCTGTGAG TTGACCCCTG TTG

23

- (2) INFORMATION FOR SEQ ID NO: 73:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 73:

ACAGGGGTCA ACTCACAGGT G

21

(2) INFORMATION FOR SEQ ID NO: 74:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 74:

GGCCTGTCGC ACCCAGTACA T

21

(2) INFORMATION FOR SEQ ID NO: 75:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 75:

ATGTACTGGG TGCACAGGC C

21

(2) INFORMATION FOR SEQ ID NO: 76:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 76:

TGTGCTAGAG GACGTGTCAG C

21

(2) INFORMATION FOR SEQ ID NO: 77:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 21 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: PCR primer

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 77:

GCTGACACGT CCTCTAGCAC A

21

- (2) INFORMATION FOR SEQ ID NO: 78:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: oligonucleotide
 - (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 78:

GGACTCACCT GAGGAGACGG T

21

- (2) INFORMATION FOR SEQ ID NO: 79:
- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: oligonucleotide
 - (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 79:

ACCGTCTCCT CAGGTGAGTC C

21

- (2) INFORMATION FOR SEQ ID NO: 80:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 80:

CCTAGTCCTT CATGACCTGA A

21

- (2) INFORMATION FOR SEQ ID NO: 81:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 21 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
 - (ii) MOLECULE TYPE: oligonucleotide
 - (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
 - (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 81:

TTCAGGTCAT GAACGACTAG G

21

- (2) INFORMATION FOR SEQ ID NO: 82:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 26 bases

- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: PCR primer
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 82:

GATCGGATCC CTATAAATCT CTGGCC

26

(2) INFORMATION FOR SEQ ID NO: 83:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 761 bases
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: oligonucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: Nucleotide sequence encoding LO-CD2a V_L chain.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 83:

ATGATGAGTC CTGTCCAGTC CCTGTTTCTG TTATTGCTTT GGATTCTGGG TAAGTAGAGA	60
ATGAGTTACA GGACAAGAAT GGGGATGGAG GATGAGTTCT GACTGCCCAT GTTGGCTGTC	120
CATGTGTGGT AAGGCAGGTC CTATTTTCTA AGATGGACAC TTGAGATTCC ATTACTTGAT	180
AATGAGAAAT TACAGATGAG ATAGGATTTG TGCTAAGAGG ATTCTAATGT AGATGAGAAG	240
GTGTATGCCA TTTAGGATCT GCAACCGAAT TGTTTGTGA AAAAGCATTT GGTATATTTT	300
TTAAAAATCA CAAAACACAC CGGGATCTCA CAGGAAATGA GTAACAAAAA GTAATTCACA	360

AAGATTGGTT GCAAATTTTG CACATAACTT TGTTC TGATC TATTATAATT TCAGGAACCA	420
ATGGTGATGT TGTGCTGACC CAGACTCCAC CTACTTTATT GGCTACCATT GGACAATCAG	480
TCTCCATCTC TTGCAGGTCA AGTCAGAGTC TCTTACATAG TAGTGGAAC ACCTATTTAA	540
ATTGGTTGCT ACAGAGGACA GGCCAATCTC CACAGCCGCT AATTTATTTG GTATCCAAAC	600
TGGAATCTGG GGTCCCCAAC AGGTTTCAAGT GCAGTGGGTC AGGAACAGAT TTCACACTCA	660
AAATCAGTGG AGTGGAAGCT GAGGATTTGG GGGTTTATTA CTGCATGCAA TTTACCCATT	720
ATCCGTACAC GTTTGGAGCT GGGACCAAGC TGGAAGTGA A	761

(2) INFORMATION FOR SEQ ID NO: 84:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 132 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Chimeric LO-CD2a V_L Chain

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 84:

Met Met Ser Pro Val Gln Ser Leu Phe

-20

-15

Leu Leu Leu Leu Trp Ile Leu Gly Thr Asn

-10

-5

Gly Asp Val Val Leu Thr Gln Thr Pro

-1 +1

5

Pro Thr Leu Leu Ala Thr Ile Gly Gln Ser

10	15	
Val Ser Ile Ser Cys Arg Ser Ser Gln Ser Leu		
20	25	
Leu His Ser Ser Gly Asn Thr Tyr Leu Asn Trp		
30	35	40
Leu Leu Gln Arg Thr Gly Gln Ser Pro Gln		
	45	50
Pro Leu Ile Tyr Leu Val Ser Lys Leu Glu		
	55	60
Ser Gly Val Pro Asn Arg Phe Ser Gly Ser		
	65	70
Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile		
	75	80
Ser Gly Val Glu Ala Glu Asp Leu Gly Val		
	85	90
Tyr Tyr Cys Met Gln Phe Thr His Tyr Pro		
	95	100
Tyr Thr Phe Gly Ala Gly Thr Lys Leu Glu		
	105	110
Leu Lys		

(2) INFORMATION FOR SEQ ID NO: 85:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 491 bases
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: oligonucleotide

(ix) FEATURE:

(A) NAME/KEY: Nucleotide sequence encoding LO-
CD2a V_H chain.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 85:

ATGAAATGCA GGTGGATCAT CCTCTTCTTG ATGGCAGTAG CTACAGGTAA GGCACCTCCCA	60
AGTCCTAAAC TTGAGAGATC ATACACTTGG GAGACAGTGA CACTATCTTT GGATTTCTTT	120
CAACAGGGGT CAACTCAGAA GTCCAGCTGC AGCAATCTGG GCCTGAGCTT CAGAGACCCG	180
GGGCCTCAGT CAAGTTGTCG TGCAAGGCTT CTGGCTATAT ATTTACAGAA TACTATATGT	240
ACTGGGTGAA GCAGAGGCCT AAACAGGGCC TGAATTAGT AGGAAGGATC GATCCTGAAG	300
ACGGTAGTAT TGATTATGTT GAGAAGTTCA AAAAGAAGGC CAACTGACT GCAGATACAT	360
CGTCCAACAC AGCCTACATG CAACTCAGCA GCCTGACATC TGAGGACACA GCAACCTATT	420
TTTGTGCTAG GGGAAAATTC AACTATCGAT TTGCTTACTG GGGCCAAGGC ACCCTCGTCA	480
CAGTCTCCTC A	491

(2) INFORMATION FOR SEQ ID NO: 86:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 137 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Amino acid sequence of chimeric
LO-CD2a V_H chain.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 86:

Met	Lys	Cys	Arg	Trp	Ile	Ile	Leu	Phe	Leu
-19				-15					-10
Met	Ala	Val	Ala	Thr	Gly	Val	Asn	Ser	Glu
				-5				-1	+1
Val	Gln	Leu	Gln	Gln	Ser	Gly	Pro	Glu	
			5					10	
Leu	Gln	Arg	Pro	Gly	Ala	Ser	Val	Lys	Leu
				15					20
Ser	Cys	Lys	Ala	Ser	Gly	Tyr	Ile	Phe	Thr
				25					30
Glu	Tyr	Tyr	Met	Tyr	Trp	Val	Lys	Gln	Arg
				35					40
Pro	Lys	Gln	Gly	Leu	Glu	Leu	Val	Gly	Arg
				45					50
Ile	Asp	Pro	Glu	Asp	Gly	Ser	Ile	Asp	Tyr
				55					60
Val	Glu	Lys	Phe	Lys	Lys	Lys	Ala	Thr	Leu
				65					70
Thr	Ala	Asp	Thr	Ser	Ser	Asn	Thr	Ala	Tyr
				75					80
Met	Gln	Leu	Ser	Ser	Leu	Thr	Ser	Glu	Asp
				85					90
Thr	Ala	Thr	Tyr	Phe	Cys	Ala	Arg	Gly	Lys
				95					100
Phe	Asn	Tyr	Arg	Phe	Ala	Tyr	Trp	Gly	Gln
				105					110

Gly Thr Leu Val Thr Val Ser Ser

115

(2) INFORMATION FOR SEQ ID NO: 87:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 112 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Rat LO-CD2a light chain variable
region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 87:

Asp Val Val Leu Thr Gln Thr Pro Pro Thr

5 10

Leu Leu Ala Thr Ile Gly Gln Ser Val Ser

15 20

Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu

25 30

His Ser Ser Gly Asn Thr Tyr Leu Asn Trp

35 40

Leu Leu Gln Arg Thr Gly Gln Ser Pro Gln

45 50

Pro Leu Ile Tyr Leu Val Ser Lys Leu Glu

55 60

Ser Gly Val Pro Asn Arg Phe Ser Gly Ser

65 70

Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile

75 80

Ser Gly Val Glu Ala Glu Asp Leu Gly Val

85 90

Tyr Tyr Cys Met Gln Phe Thr His Tyr Pro

95 100

Tyr Thr Phe Gly Ala Gly Thr Lys Leu Glu

105 110

Leu Lys

(2) INFORMATION FOR SEQ ID NO: 88:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 112 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Humanized LO-CD2a light chain
variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 88:

Asp Val Val Met Thr Gln Ser Pro Pro Ser

5 10

Leu Leu Val Thr Leu Gly Gln Pro Ala Ser

	15	20
Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu		
	25	30
His Ser Ser Gly Asn Thr Tyr Leu Asn Trp		
	35	40
Leu Leu Gln Arg Pro Gly Gln Ser Pro Gln		
	45	50
Pro Leu Ile Tyr Leu Val Ser Lys Leu Glu		
	55	60
Ser Gly Val Pro Asp Arg Phe Ser Gly Ser		
	65	70
Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile		
	75	80
Ser Gly Val Glu Ala Glu Asp Val Gly Val		
	85	90
Tyr Tyr Cys Met Gln Phe Thr His Tyr Pro		
	95	100
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu		
	105	110
Ile Lys		

(2) INFORMATION FOR SEQ ID NO: 89:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 112 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Light chain variable region of
HUM5400

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 89:

Asp	Val	Val	Met	Thr	Gln	Ser	Pro	Leu	Ser
				5					10
Leu	Pro	Val	Thr	Leu	Gly	Gln	Pro	Ala	Ser
				15					20
Ile	Ser	Cys	Arg	Ser	Ser	Gln	Ser	Leu	Val
				25					30
Tyr	Ser	Asp	Gly	Asn	Thr	His	Leu	Asn	Trp
				35					40
Phe	Gln	Gln	Arg	Pro	Gly	Gln	Ser	Pro	Arg
				45					50
Arg	Leu	Ile	Tyr	Lys	Val	Ser	Asn	Arg	Asp
				55					60
Ser	Gly	Val	Pro	Asp	Arg	Phe	Ser	Gly	Ser
				65					70
Gly	Ser	Gly	Thr	Asp	Phe	Thr	Leu	Lys	Ile
				75					80
Ser	Arg	Val	Glu	Ala	Glu	Asp	Val	Gly	Val
				85					90
Tyr	Tyr	Cys	Met	Gln	Gly	Thr	His	Trp	Pro
				95					100

Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu

105

110

Ile Lys

(2) INFORMATION FOR SEQ ID NO: 90:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 807 bases

(B) TYPE: nucleic acid

(C) STRANDEDNESS: single

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polynucleotide

(ix) FEATURE:

(A) NAME/KEY: Nucleotide sequence encoding
humanized LO-CD2a light chain variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 90:

AAGCTTCATG ATGAGTCCTG TCCAGTCCCT GTTTCTGTTA TTGCTTTGGA TTCTGGGTAA	60
GTAGAGAATG AGTTACAGGA CAAGAATGGG GATGGAGGAT GAGTTCTGAC TGCCCATGTT	120
GGCTGTCCAT GTGTGGTAAG GCAGGTCCTA TTTTCTAAGA TGGACACTTG AGATTCCATT	180
ACTTGATAAT GAGAAATTAC AGATGAGATA GGATTTGTGC TAAGAGGATT CTAATGTAGA	240
TGAGAAGGTG TATGCCATTT AGGATCTGCA ACCGAATTGT TTTGTGAAAA AGCATTGGGT	300
ATATTTTTTA AAAATCACAA AACACACCGG GATCTCACAG GAAATGAGTA ACAAAAAGTA	360
ATTCACAAAG ATTGGTTGCA AATTTTGCAC ATAACTTTGT TCTGATCTAT TATAATTTCA	420
GGAACCAATG GTGATGTTGT GATGACCCAG AGTCCACCTT CATTATTGGT AACCTTGGGA	480
CAACCAGCTT CCATCTCTTG CAGGTCAAGT CAGAGTCTCT TACATAGTAG TGGAAACACC	540
TATTTAAATT GGTGCTACA GAGGCCAGGC CAATCTCCAC AGCCGCTAAT TTATTTGGTA	600
TCCAAACTGG AATCTGGGGT CCCCAGACAGG TTCAGTGGCT CAGGGAGTGG AACAGATTTT	660

ACACTCAAAA	TCAGTGGAGT	GGAAGCTGAG	GATGTGGGGG	TTTATTACTG	CATGCAATTT	720
ACCCATTATC	CGTACACGTT	TGGACAAGGG	ACCAAGCTGG	AAATCAAACG	TGAGTAGAAT	780
TTAAACTTTG	CTTCCTCAGT	TGGATCC				807

(2) INFORMATION FOR SEO ID NO: 91:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 132 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) **FEATURE:**

(A) NAME/KEY: Humanized LO-CD2a light chain
variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 91:

Met Met Ser Pro Val Gln Ser Leu Phe Leu Leu

-20 -15 -10

Leu Leu Trp Ile Leu Gly Thr Asn Gly Asp

-5 -1 +1

Val Val Met Thr Gln Ser Pro Pro Ser

5 10

Leu Leu Val Thr Leu Gly Gln Pro Ala Ser

15 20

Ile Ser Cys Arg Ser Ser Gln Ser Leu Leu

25 30

His Ser Ser Gly Asn Thr Tyr Leu Asn Trp

	35	40
Leu Leu Gln Arg Pro Gly Gln Ser Pro Gln		
	45	50
Pro Leu Ile Tyr Leu Val Ser Lys Leu Glu		
	55	60
Ser Gly Val Pro Asp Arg Phe Ser Gly Ser		
	65	70
Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile		
	75	80
Ser Gly Val Glu Ala Glu Asp Val Gly Val		
	85	90
Tyr Tyr Cys Met Gln Phe Thr His Tyr Pro		
	95	100
Tyr Thr Phe Gly Gln Gly Thr Lys Leu Glu		
	105	110
Ile Lys		

(2) INFORMATION FOR SEQ ID NO: 92:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 118 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Rat LO-CD2a heavy chain variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 92:

Glu	Val	Gln	Leu	Gln	Gln	Ser	Gly	Pro	Glu		
				5					10		
Leu	Gln	Arg	Pro	Gly	Ala	Ser	Val	Lys	Leu		
				15					20		
Ser	Cys	Lys	Ala	Ser	Gly	Tyr	Ile	Phe	Thr		
				25					30		
Glu	Tyr	Tyr	Met	Tyr	Trp	Val	Lys	Gln	Arg		
				35					40		
Pro	Lys	Gln	Gly	Leu	Glu	Leu	Val	Gly	Arg		
				45					50		
Ile	Asp	Pro	Glu	Asp	Gly	Ser	Ile	Asp	Tyr		
				55					60		
Val	Glu	Lys	Phe	Lys	Lys	Lys	Ala	Thr	Leu		
				65					70		
Thr	Ala	Asp	Thr	Ser	Ser	Asn	Thr	Ala	Tyr		
				75					80		
Met	Gln	Leu	Ser	Ser	Leu	Thr	Ser	Glu	Asp		
				85					90		
Thr	Ala	Thr	Tyr	Phe	Cys	Ala	Arg	Gly	Lys		
				95					100		
Phe	Asn	Tyr	Arg	Phe	Ala	Tyr	Trp	Gly	Gln		
				105					110		
Gly	Thr	Leu	Val	Thr	Val	Ser	Ser				

(2) INFORMATION FOR SEQ ID NO: 93:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 118 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Humanized LO-CD2a heavy chain
variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 93:

Gln Val Gln Leu Val Gln Ser Gly Ala Glu

5 10

Val Lys Lys Pro Gly Ala Ser Val Lys Val

15 20

Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr

25 30

Glu Tyr Tyr Met Tyr Trp Val Arg Gln Ala

35 40

Pro Gly Gln Gly Leu Glu Leu Met Gly Arg

45 50

Ile Asp Pro Glu Asp Gly Ser Ile Asp Tyr

55 60

Val Glu Lys Phe Lys Lys Lys Val Thr Leu

Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr	
	25 30
Gly Tyr Tyr Met His Trp Val Arg Gln Ala	
	35 40
Pro Gly Gln Gly Leu Glu Trp Met Gly Arg	
	45 50
Ile Asn Pro Asn Ser Gly Gly Thr Asn Tyr	
	55 60
Ala Gln Lys Phe Gln Gly Arg Val Thr Met	
	65 70
Thr Arg Asp Thr Ser Ile Ser Thr Ala Tyr	
	75 80
Met Glu Leu Ser Arg Leu Arg Ser Asp Asp	
	85 90
Thr Ala Val Tyr Tyr Cys Ala Arg Gly Arg	
	95 100
Thr Glu Tyr Ile Val Val Ala Glu Gly Phe	
	105 110
Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr	
	115 120
Val Ser Ser	

(2) INFORMATION FOR SEQ ID NO: 95:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 701 bases

(B) TYPE: nucleic acid

- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: polynucleotide
- (ix) FEATURE:
 - (A) NAME/KEY: Nucleotide sequence encoding LO-CD2a heavy chain variable region.
- (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 95:

AAGCTTCATG AAATGCAGGT GGATCATCCT CTTCTTGATG GCAGTAGCTA CAGGTAAGGC	60
ACTCCCAAGT CCTAAACTTG AGAGATCATA CACTTGGGAG ACAGTGACAC TATCTTTGGA	120
TTTCTTTCAA CAGGGGTCAA CTCACAGGTG CAGCTGGTGC AGTCTGGGGC TGAGGTGAAG	180
AAGCCTGGGG CCTCAGTGAA GGTCTCCTGC AAGGCTTCTG GATACACCTT CACCGAGTAC	240
TATATGTACT GGGTGCGACA GGCCCTGGA CAAGGGCTTG AGCTGATGGG AAGGATCGAT	300
CCTGAAGACG GTAGTATTGA TTATGTTGAG AAGTTTAAGA AAAAGGTCAC CCTGACCGCT	360
GACACGTCCT CTAGCACAGC CTACATGGAG CTGAGCAGCC TGACCTCTGA CGACACGGCC	420
GTGTATTACT GTGCGAGAGG AAAGTTTAAC TATAGGTTTG CTTACTGGGG CCAAGGAACC	480
CTGGTCACCG TCTCCTCAGG TGAGTCCTTA CAACCTCTCT CTTCTATTCA GCTTAAATAG	540
ATTTTACTGC ATTTGTTGGG GGGGAAATGT GTGTATCTGA ATTCAGGTC ATGAAGGACT	600
AGGGACACCT TGGGAGTCAG AAAGGGTCAT TGGGAGCCCG GGCTGATGCA GACAGACATC	660
CTCAGCTCCC GGACTTCATG GCCAGAGATT TATAGGGATC C	701

(2) INFORMATION FOR SEQ ID NO: 96:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 137 amino acids
 - (B) TYPE: amino acid
 - (C) STRANDEDNESS:
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: polypeptide

(ix) FEATURE:

(A) NAME/KEY: Humanized LO-CD2a heavy chain
variable region.

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 96:

Met Lys Cys Arg Trp Ile Ile Leu Phe Leu

-19 -15 -10

Met Ala Val Ala Thr Gly Val Asn Ser Gln

-5 -1 1

Val Gln Leu Val Gln Ser Gly Ala Glu

5 10

Val Lys Lys Pro Gly Ala Ser Val Lys Val

15 20

Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr

25 30

Glu Tyr Tyr Met Tyr Trp Val Arg Gln Ala

35 40

Pro Gly Gln Gly Leu Glu Leu Met Gly Arg

45 50

Ile Asp Pro Glu Asp Gly Ser Ile Asp Tyr

55 60

Val Glu Lys Phe Lys Lys Lys Val Thr Leu

65 70

Thr Ala Asp Thr Ser Ser Ser Thr Ala Tyr

75 80

Met Glu Leu Ser Ser Leu Thr Ser Asp Asp

	85		90
Thr	Ala	Val	Tyr Tyr Cys Ala Arg Gly Lys
	95		100
Phe	Asn	Tyr Arg	Phe Ala Tyr Trp Gly Gln
	105		110
Gly	Thr	Leu Val	Thr Val Ser Ser
	115		